

**WHAT IS CLAIMED IS:**

- 1     **1.**     An optical coupler comprising:
  - 2                     a housing with a rotatable distal face and a stationary proximal
  - 3                     face, the distal face having an eccentric port and a central port
  - 4                     a lens disposed inside the housing to intercept a rotating collection
  - 5                     beam emerging from the eccentric port and to re-direct the
  - 6                     collection beam to a focus proximal to the lens as the collection
  - 7                     beam rotates; and
  - 8                     a beam re-director disposed between the lens and the distal face,
  - 9                     the beam re-director being oriented to direct a delivery beam
  - 10                    toward the central port.
- 11    **2.**     The optical coupler of claim 1, further comprising a light source disposed to
- 12                    direct a delivery beam radially inward to the beam re-director.
- 13    **3.**     The optical coupler of claim 1, wherein the beam re-director comprises a
- 14                    penta-prism.
- 15    **4.**     The optical coupler of claim 1, wherein the beam re-director comprises a
- 16                    prism.
- 17    **5.**     The optical coupler of claim 1, wherein the beam re-director comprises a
- 18                    mirror.
- 19    **6.**     The optical coupler of claim 1, further comprising a detector disposed at the
- 20                    focus for receiving the rotating collection beam.
- 21    **7.**     The optical coupler of claim 1, wherein the lens is configured to focus the
- 22                    collection beam on an axis of rotation of the distal face.
- 23    **8.**     The optical coupler of claim 1, wherein the lens is configured to focus the
- 24                    collection beam off an axis of rotation of the distal face.
- 25    **9.**     The optical coupler of claim 1, wherein the lens comprises an axicon lens.

- 26   **10.**     A system for identifying vulnerable plaque, the system comprising:
- 27                   a rotating catheter having a collection fiber and a delivery fiber  
28                   extending therethrough;
- 29                   a housing with a rotatable distal face and a stationary proximal  
30                   face, the distal face having an eccentric port and a central port
- 31                   a lens disposed inside the housing to intercept a rotating collection  
32                   beam emerging from the eccentric port and to re-direct the  
33                   collection beam to a focus proximal to the lens as the collection  
34                   beam rotates; and
- 35                   a beam re-director disposed between the lens and the distal face,  
36                   the beam re-director being oriented to direct a delivery beam  
37                   toward the central port.
- 38   **11.**     The system of claim 10, further comprising a light source disposed to direct a  
39                   delivery beam radially inward to the beam re-director.
- 40   **12.**     The system of claim 10, wherein the beam re-director comprises a penta-  
41                   prism.
- 42   **13.**     The system of claim 10, wherein the beam re-director comprises a prism.
- 43   **14.**     The system of claim 10, wherein the beam re-director comprises a mirror.
- 44   **15.**     The system of claim 10, further comprising a detector disposed at the focus  
45                   for receiving the rotating collection beam.
- 46   **16.**     The system of claim 10, wherein the lens comprises an axicon lens.